REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
	Technical Papers	

4. TITLE AND SUBTITLE

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

5d. PROJECT NUMBER
6340

5e. TASK NUMBER
RCEX

5f. WORK UNIT NUMBER
346033

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Air Force Research Laboratory (AFMC)
AFRL/PRS
5 Pollux Drive
Edwards AFB CA 93524-7048

8. PERFORMING ORGANIZATION REPORT

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Air Force Research Laboratory (AFMC)
AFRL/PRS
5 Pollux Drive
Edwards AFB CA 93524-7048

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
					Leilani Richardson
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER *(include area code)*
Unclassified	Unclassified	Unclassified	A		(661) 275-5015

MEMORANDUM FOR PRS (In-House Publication)

63401? CEX
94C 0112

FROM: PROI (STINFO)

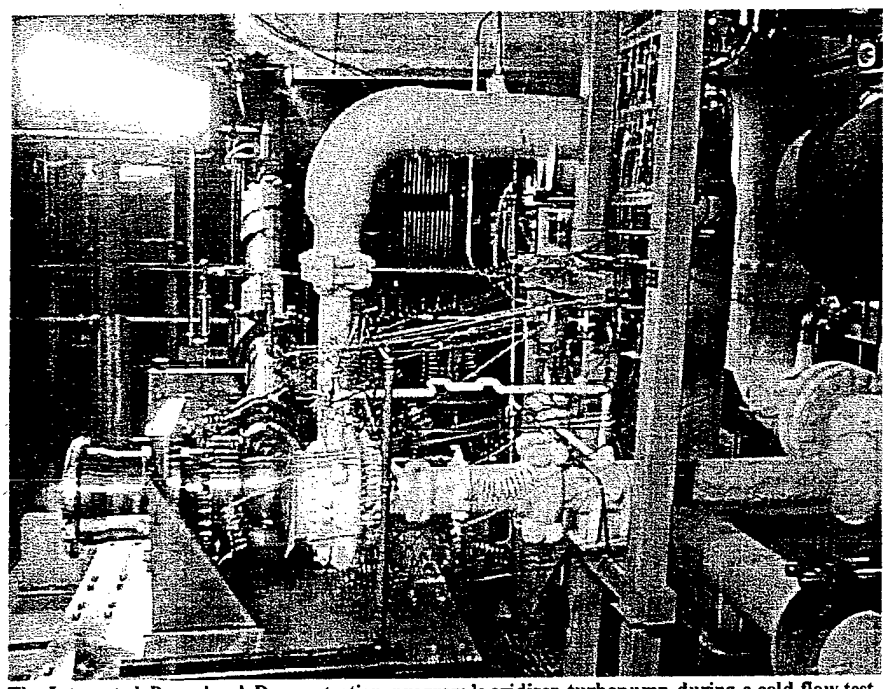
20 May 2002

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-TP-2002-122**
Capt Jeff Thornburg and Lt Daniel Wright (PRSE), "Integrated Powerhead Demonstration's Oxidizer Turbopump Cold Flow Tests Completed"

No Forum/Audience Provided
No Meeting Location/Date or Deadline Provided

(Statement A)

Integrated Powerhead Demonstration's Oxidizer Turbopump Cold Flow Tests Completed



The Integrated Powerhead Demonstration program's oxidizer turbopump during a cold flow test in Nov 2001.

Payoff

The Integrated Powerhead Demonstration (IPD) program successfully completed a series of cold flow tests on its oxidizer turbopump. This technology development turbopump demonstrated a number of innovative technologies: 1) A rotor fully supported by hydrostatic bearings and a balance piston. 2) A blisk and turbine components designed to be compatible with a high-temperature oxygen-rich environment. 3) A back-up clutching bearing. 4) A lift-off seal to separate the cryogenic and hot-gas regions of the pump.

Accomplishment

The Propulsion Directorate completed this series of 11 tests on the oxidizer turbopump in November of 2001. Driven with gaseous nitrogen which pumps liquid nitrogen, the pump met all target test objectives. The tests conducted at NASA Stennis Space Center, Mississippi were completely successful. Hot gaseous oxygen will drive the turbopump in the next test series, with liquid oxygen being pumped. A standard oxygen-rich pre-burner is currently being characterized for use in this follow-on hot-gas testing. An IPD oxygen-rich pre-burner is under development for future tests.

Background

The IPD program is an integral part of the Integrated High Payoff Rocket Propulsion Technology (IHPRPT) program. The IPD turbomachinery effort has two main technical

goals: (1) to increase turbine life by using a full flow cycle staged combustion design and (2) to increase bearing lifetime and reduce wear by incorporating hydrostatic bearing technology in both the oxygen and hydrogen turbopumps.

This IHPRPT program demonstration is one of many in a series that are part of a three phase, government and industry coordinated effort that began in 1993. The overall program vision is to double the nation's propulsion capability by 2010. The Program is endorsed by both government and industry with representatives from industry, NASA, Air Force, Army, Navy, and the Office of the Secretary of Defense. To show achievement of goals, there is a demonstration at the end of each of the three distinct phases.